State of Kansas
Nonpoint Source Water Quality Protection Project
Completion - Final Performance Report

Report Date: 8/9/02
KDHE Project Number: 99-058 **GRTS Number:** 98-17
Grant Number: C9007405-98 **Project Start:** 4/1/1999 **Project End:** 9/30/2001

Project Name: Watershed Dairy Environmental Cooperative - Part 1

Grant Amount: $150,000.00 **Residual Grant Funds:** $21,175

Required Nonfederal Contribution: $100,000 **Actual Nonfederal Contribution:** $100,913.14

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Project Sponsor: Kansas State University
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Project Scope: Statewide

Project Description & Objectives: The goal of this project is to reduce manure and effluent nutrients leaving farmsteads and manage controlled nutrients with cropping practices. Project objectives include:

1. Develop and install demonstration systems for storage of dairy manure and effluent to reduce nutrient, fecal coliform and sediment runoff.

2. Develop and deliver educational programs for dairy farmers to assist in implementing Best Management Practices for on-farm utilization of stored nutrients in lagoons or solid storage basins.

3. Develop local environmental cooperatives for dairy farmers to design waste management systems and facilitate waste management.

Project Accomplishments:

The Watershed Dairy Environmental Cooperative - Part 1 was able to provide assistance to 13 small dairy producers managing 1,680 lactating cows. These producers voluntary worked with the program in addressing environmental issues. Prior to participating in the program, the dairy producers were not able to store manure during extended wet weather or extremely cold weather when ground was frozen. Frequently, manure would have been applied to wet ground. The program enabled them to increase the storage capacity and change management practices to haul prior to tillage operations. This reduced soil

compaction, nutrient losses and prevented runoff and nutrient losses during wet weather. Generally, the dairies had more time to manage the dairy cows since cows number tended to increase once environmental issues were addressed. The dairies were located in four different watersheds. Most of the dairies were in the Nemaha watershed that is adjacent to the Black Vermillion watershed where work had begun previously. Dairies in the Nemaha watershed heard of the program through contact with producers in the other watershed. Manure sampling was begun on nine dairies in northeast, Kansas.

Nine concrete storage basins were sampled on Kansas dairies and analyzed for nutrient content of sand laden dairy manure. The manure average 75 percent moisture content during the three sampling periods. The average total nitrogen, phosphate and potash was 9.7, 4.6 and 7.4 lbs/ton, respectively. The data collected from the basins suggest if the scraped manure from a dairy was applied at an agronomic rate of 15 tons or less per acre, there should be minimal accumulation of nutrients, in particular phosphorus. The manure value was $3 to $4 per ton depending on whether commercial sources of phosphorus would normally be applied to the cropland.

Preliminary soil sampling indicates sixty four percent of the fields (7 of 11) in northeast Kansas would be able to apply dairy manure on a nitrogen basis if the current Kansas swine manure application regulations were adopted. Due to high phosphorus levels in some fields, 2 of the 11 fields in northeast Kansas could not have any manure applied to them. Two other fields in northeast Kansas would have to limit manure application rates to the crop phosphorus usage. The data showed minimal accumulation of nitrogen and potassium in the soil profile.

Work Products:

Lessons Learned:

1. If phosphorus regulations were implemented, approximately 80 percent of the crop land receiving dairy manure would be able to meet current manure application guidelines similar to those implemented for the Kansas swine industry.

2. Dairies feeding similar feed rations will have similar nutrient contents in the solid manure basins. In addition, nutrient contents within the basin was similar throughout the year. This would enable more broad based nutrient management plans to be developed versus individual plans for each farm.

3. The nitrogen to phosphate ratio was approximately 2.5 to 1, nutrient management plans developed on a nitrogen bases would not result in excessive phosphorus being applied to the land assuming supplemental phosphorus was not being applied when using commercial fertilzers.

4. Approximately 10 to 25 percent of the manure applied to the land by weight was sand based on the ash content of the samples taken from dairies bedding free stalls with sand..

5. In the concrete solid storage basins, the moisture content of the manure averaged 75 percent during the winter and spring months.

6. The economic value of the nutrients in the manure was $3 to $4 per ton depending upon the current phosphorus levels in the crop land.

Remaining Needs:
At the completion of this project, there were 12 dairies still seeking assistance. A comparison between milk inspector permits and environmental permits indicates there are under 600 dairies but over 1,000 environmental permits issued. Some dairies may have multiple permits or sites have changed ownership with the original owner still on record as having a permit. Therefore, it is difficult to access the number of dairies that are not permitted. With the expansion of dairies in southwest, Kansas, it is estimated 70 to 80 percent of the cows in Kansas are being housed on facilities that are permitted. Dairies participating in the Black Vermillion and Dairy Environmental Cooperative program still have trouble with record keeping of volumes of manure applied along with location. This appears to be a continual problem even with the larger dairies during site visits and discussions. Efforts are needed to develop a producer friendly record keeping system. Manure nutrient management remains a critical issue, in particular, ensuring the commercial fertilizer applicators are making adequate allowances for manure nutrients.

Plans to Address Remaining Needs:
KSU will:
1. Increase efforts on the manure nutrient management including record keeping along with application

2. Summarize the data on manure nutrients in solid storage basins and lagoons on dairies flushing versus scraping and it's potential impact on nutrient management planning.

3. Develop a series on web based publications on manure nutrient management and options for handling manure on dairies and focus on the educational delivery of the information obtained for the DEC-Part 1 program.

4. Continue to work with dairies in evaluating their options for addressing environmental issues. Along with assisting other agencies in helping small dairies seeking to implement control strategies.

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KDHE plans to provide at least three additional Section 319 grants to support implementation of water quality protection measures by Kansas dairies. KDHE will provide KSU a grant of $21,175 to develop a livestock pollution control web site. The web site will be developed for dairies but will be designed to accommodate addition of information related to beef and swine at some future time.